CLAIMS

The embodiments of the invention in which an exclusive property or right is claimed are defined as follows. Having thus described the invention what is claimed is:

1. A sensor method, comprising the steps of:

providing a sensor for measuring a thermal conductivity of a fluid, wherein said sensor comprises at least one fluid sensing element associated with a sensor substrate;

associating a heater with said sensor wherein said heater provides heat to said fluid; and

providing a film component that isolates said fluid from said heater and said sensor, such that said film component conducts heat in a direction from said heater to said sensor, thereby forming a thermal coupling between said sensor, said heater and said fluid, which permits said sensor to determine a composition of said fluid by measuring thermal conductivity thereof without undesired losses of heat in other directions.

2. The method of claim 1 further comprising the step of configuring said film component to comprise a tubing composed of at least one wall have a wall thickness thereof, wherein a plurality of thermally conductive particles are dispersed within said at least one wall of said tubing.

3. The method of claim 2 further comprising the step of configuring each particle of said plurality of thermally conductive particles to comprise a particle diameter that is approximately equivalent to said wall thickness.

4. The method of claim 2 further comprising the step of forming said

tubing from a plastic, such that said plurality of thermally conductive particles possesses a high thermal conductivity and said plastic possesses a lower electrical conductivity.

5. The method of claim 2 further comprising the step of forming said plurality of thermally conductive particles from diamond.

6. The method of claim 2 further comprising the step of forming said plurality of thermally conductive particles comprises particles from crystalline ceramic materials.

5. The method of claim 2 further comprising the step of forming said plurality of thermally conductive particles from anodized aluminum.

6. The method of claim 2 further comprising the steps of:

configuring said film component from a low thermal conductivity polymer;

associating a metal with said low thermal conductivity polymer;

etching said metal located below said low thermal conductivity polymer to form a plurality of metal dots upon said low thermal conductivity polymer, thereby providing said film component with said plurality of metal dots plated in a polymer background thereof, such said plurality of metal dots comprise said plurality of thermally conductive particles.

7. The method of claim 2 further comprising the steps of:

configuring said film component from a low thermal conductivity polymer;

associating a metal with said low thermal conductivity polymer;

laser drilling said low thermal conductivity polymer to form a cavity therein; and

thereafter filling said cavity with metal up to a surface of said polymer to provide planarization to a plated side of said polymer, such said plurality of metal dots comprises said plurality of thermally conductive particles.

8. The method of claim 1 further comprising the step of configuring said sensor to comprise a sensor die mounted and wire bonded to said sensor substrate, wherein said sensor substrate provides a low thermal conductivity base mounting structure wherein energy thereof is maximized for liquid flow detection.

9. The method of claim 1 further comprising the step of configuring said film component to comprise a flow channel having an oval cross sectional area thereof that covers a majority surface area of said at least one sensing element of said sensor.

10. The method of claim 1 further comprising the step of configuring said film component to comprise a flow channel having a "D" shaped cross sectional area thereof that covers a majority surface area of said at least one sensing element of said sensor.

11. A sensor method, comprising the steps of:

providing a sensor for measuring a thermal conductivity of a fluid, wherein said sensor comprises at least one fluid sensing element;

configuring said sensor from a sensor die mounted and bonded to a

fiber glass substrate, thereby providing a fiberglass base mounting structure wherein energy is maximized for liquid flow detection;

associating a heater with said sensor wherein said heater provides heat to said fluid;

providing a film component that isolates said fluid from said heater and said sensor, such that said film component conducts heat in a direction from said heater to said sensor, thereby forming a thermal coupling between said sensor, said heater and said fluid, which permits said sensor to determine a composition of said fluid by measuring thermal conductivity thereof without undesired losses of heat in other directions;

configuring said film component to comprise a tubing composed of at least one wall have a wall thickness thereof, wherein a plurality of thermally conductive particles are dispersed within said at least one wall of said tubing.

configuring each particle of said plurality of thermally conductive particles to comprise a particle diameter that is approximately equivalent to said wall thickness; and

forming said tubing from a plastic, such that said plurality of thermally conductive particles possesses a high thermal conductivity and a low electrical conductivity.

12. A sensor system, comprising:

a sensor for measuring a thermal conductivity of a fluid, wherein said sensor comprises at least one fluid sensing element associated with a sensor substrate;

a heater for providing heat to said fluid; and

a film component that isolates said fluid from said heater and said sensor, such that said film component conducts heat in a direction from said heater to said sensor, thereby providing a thermal coupling between said sensor, said heater and said fluid, which permits said sensor to determine a composition of said fluid by measuring thermal conductivity thereof without undesired losses of heat in other directions.

13. The system of claim 12 wherein said film component comprises a film composed of at least one wall have a wall thickness thereof, wherein a plurality of thermally conductive particles are dispersed within said at least one wall of said film.

14. The system of claim 13 wherein each particle of said plurality of thermally conductive particles comprises a particle diameter that is approximately equivalent to said wall thickness.

15. The system of claim 13 wherein said film comprises plastic, such that said plurality of thermally conductive particles possess a high thermal conductivity and a low electrical conductivity.

16. The system of claim 13 wherein said plurality of thermally conductive particles comprises particles formed from at least one of the following materials: diamond, crystalline ceramic, and anodized aluminum.

17. The system of claim 13 wherein said film component comprises a low thermal conductivity polymer plated with a plurality of metal dots, wherein said plurality of metal dots are formed by patterning said low thermal conductivity polymer and thereafter providing an etch upon a metal associated with said low thermal conductivity polymer to thereby provide said film component with said plurality of metal dots in a polymer background thereof, such said plurality of metal dots comprise said plurality of thermally

conductive particles.

18. The system of claim 13 wherein said film component comprises a low thermal conductivity polymer plated with a plurality of metal dots, wherein said plurality of metal dots are formed by laser drilling said low thermal conductivity polymer to form a cavity thereof and thereafter filling said cavity with metal up to a surface of said polymer to provide planarization to a plated side of said polymer, such said plurality of metal dots comprise said plurality of thermally conductive particles.

19. The system of claim 12 wherein said sensor comprises a sensor die mounted and bonded to said sensor substrate, wherein said sensor substrate comprises a low thermal conductivity base mounting structure wherein energy transfer thereof is maximized for liquid flow detection.

20. The system of claim 12 wherein said film component comprises a flow channel having an oval cross sectional area thereof that covers a majority surface area of said at least one sensing element of said sensor and wherein said flow channel is applied to said at least one sensing element utilizing a thermally conducting fluid to maximize thermal conductivity.